

LESS TRADITIONAL, LESS SUCCESS: THE NEGATIVE EFFECT OF
NONTRADITIONAL STUDENTS ON COMMUNITY COLLEGE GRADUATION
RATES

by
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Abstract

Community colleges enroll 40% of all undergraduates and 60% of community college students are independent for financial aid purposes. Independent students, with a number of nontraditional traits, are increasing as high school graduate numbers dwindle in large parts of the country. However, the presence of nontraditional students as an institutional characteristic, and its effect on graduation rates, has not been previously studied quantitatively or at scale. Using data from the US Department of Education's College Scorecard, regression analysis found a substantial and statistically significant negative effect of a college's independent student percent on its graduation rate. This effect of between -12.5% and -25.2% remained after holding other previously identified variables constant and examining the interaction between independent percent and part-time attendance percent. These findings suggest that one or more obstacles unique to nontraditional students must be identified and remediated to increase graduation rates.

Table of Contents

1. Introduction	1
2. Literature Review and Theoretical Framework	3
2.1 Community Colleges	3
2.2 Measuring Success	5
2.3 Nontraditional Students	7
3. Data and Methods	9
3.1 Source	9
3.2 Variables	10
3.3 Methods	12
4. Results	12
4.1 Multiple Regressions	14
4.2 Interactive Effect Regressions	15
4.3 Cross-Model Results	16
5. Conclusion	17
5.1 Limitations of the Research	18
5.2 Future Avenues for Research	19
5.3 Policy Implications	20
6. References	21
7. Curriculum Vita	24

1. Introduction

Community colleges are a unique, complex, and diverse engine of economic mobility in the United States. These institutions serve dual purposes of training students for the workforce, through non-credit training and terminal certificates and associate's degrees, and further education, through transfer-oriented associate's degrees and articulation agreements with four-year institutions. The Obama Administration acknowledged the value community colleges contribute to their students and communities through the creation of targeted grant programs and initiatives and the Trump Administration has pledged to do the same.

As institutions with an open access mission, they accept all students, regardless of prior performance in high school or at other colleges. This type of college is designed to meet students where they are in their academic pathways, providing high school equivalency classes, English as a Second Language classes, remedial math and English classes, and deep academic supports such as tutoring and mentoring. Faculty at two-year institutions are devoted to teaching instead of research and publication, further creating the conditions for success for the large swathes of society they serve.

These supportive environments are crucial for the success of the community college student, who is much more likely to be a nontraditional student in some way, such as parent to one or more children or beginning their college education many years after graduating high school. These nontraditional students are turning to college in order to earn degrees that will lead to jobs and careers that pay family-sustaining wages as the number of jobs requiring college degrees, both associate's and bachelor's, continues to climb at the expense of jobs requiring only a high school diploma or equivalent.

The rise in national prominence of the community college, the opportunities they afford to students, and the kind of student attending the community college make graduation rates at those institutions critically important. As a sector, research on community colleges has lagged behind that on four-year colleges and universities, and the research on nontraditional students has not caught up to the increase in their attendance. National associations and movements including Achieving the Dream and Complete College America are encouraging the use of data-driven decision making and providing community colleges with the latest evidence-based policies available to help them help this student population, but much work remains in order to discover and evaluate effective graduation-increasing practices.

The trend at the national level to standardize data across institutions, and the more recent drive to provide open data to the public to help them make informed choices, has resulted in a dataset capable of documenting the performance of nontraditional students at community colleges across the country. Using this College Scorecard dataset, this analysis finds a distinct, sizeable, and persistent negative effect of nontraditional students on a community college's graduation rate. This holds true controlling for other factors hypothesized to influence an institution's graduation rate, including the percentage of faculty teaching full time and the percentage of students that are not white. That negative effect also persists when examining the interactive effect of nontraditional students and the percent of students attending part-time.

This analysis is the first step in establishing a baseline. With the lack of success among this population bracingly clear, research must continue to examine the reasons behind the low graduation rates, investigate methods to address those obstacles, and

continue to examine institutional performance. The large increases in nontraditional student populations will only continue as more and more career paths are closed to those without postsecondary education, making the status quo untenable.

2. Literature Review and Theoretical Framework

2.1 Community Colleges

Community colleges were founded around the turn of the twentieth century by the president of the University of Chicago who developed a system of six-year high schools and two-year junior colleges.¹ Although the number of community colleges expanded to accommodate returning WWII servicemen in the 1940s and 1950s, dramatic expansion occurred in the 1960s, doubling the number of colleges and quadrupling enrollments.² As of 2016, there are 1,579 institutions granting 2-year degrees; this includes public and private institutions and branch campuses.³

This institution type is “open-enrollment,” where students can enroll regardless of previous performance in high school, other colleges, or on standardized tests. Kane and Rouse cover many of the arguments made for the development and expansion of two-year colleges; these include providing specialized vocational training, alternately culling or supporting students more poorly prepared for collegiate work than their university peers, and the democratic ideal that people deserve access to opportunity and second chances.⁴ All of these are likely true in various amounts across the nation’s community

¹ Thomas J. Kane and Cecilia Elena Rouse, “The Community College: Educating Students at the Margin between College and Work,” *The Journal of Economic Perspectives* 13, no. 1 (1999): 63-64.

² *Ibid.*, 64.

³ National Center for Education Statistics, “Digest of Education Statistics Table 317.10: Degree-granting Postsecondary Institutions, by Control and Level of Institution: Selected Years, 1949-50 through 2015-16,” *US Department of Education*, November 2016, https://nces.ed.gov/programs/digest/d16/tables/dt16_317.10.asp.

⁴ Kane and Rouse, “Educating Students at the Margin”.

colleges, but the unifying point is that community colleges serve as the gateway to higher education for those who would not be able to participate otherwise. A strong network of community colleges, fulfilling either their transfer preparation role or workforce development role, is vital to creating an educated and productive citizenry.

Community colleges serve a diverse student body. Two-year institutions enroll 40% of all undergraduates⁵ and almost half of all Latino students.⁶ Community college students are also socioeconomically diverse: 58% receive student financial aid, 36% are the first in their family to attend college, and 17% are single parents.⁷ The importance of the two-year college, and its success in graduating students, is paramount for these underrepresented populations.

Although research on community colleges in general remains rare (as of 2016, only one journal dedicated to community colleges publishes monthly),⁸ some centers and publications have examined institutional influences on community college graduation rates. The Community College Research Center, housed at Columbia University, published a study in 2005 examining institutional characteristics' effect on graduation outcomes which found that institution size, percent of faculty that is part-time, and percent of student body that is non-white all lower a student's likelihood of graduating

⁵ National Center for Education Statistics, "Digest of Education Statistics Table 303.60: Total Fall Enrollment in Degree-Granting Postsecondary Institutions, by Level of Enrollment, Sex of Student, and Other Selected Characteristics: 2015," *US Department of Education*, September 2016, https://nces.ed.gov/programs/digest/d16/tables/dt16_303.60.asp.

⁶ National Center for Education Statistics, "Digest of Education Statistics Table 306.20: Total Fall Enrollment in Degree-granting Postsecondary Institutions, by Level and Control of Institution and Race/Ethnicity of Student: Selected Years, 1976 through 2015," *US Department of Education*, October 2016, https://nces.ed.gov/programs/digest/d16/tables/dt16_306.20.asp.

⁷ "Fast Facts from Our Fact Sheet," *American Association of Community Colleges*, last modified June 2017, <http://aacc.nche.edu/ABOUTCC/Pages/fastfactsfactsheet.aspx>.

⁸ Deborah L. Floyd, Rivka A. Felsher, and Gianna Ramdin, "A Retrospective of Four Decades of Community College Research," *Community College Journal of Research and Practice* 40, no. 1 (2016): 6.

with a degree.⁹ Subsequent studies disputed the impact of faculty adjunct status¹⁰ and which institution size has a positive impact on graduation¹¹ but added percent of students attending full-time as an impactful variable.¹²

Many gaps are apparent in the current literature, chief among them the scarcity of research on student and institutional characteristics which impact graduation rates. The studies cited above do not examine national populations, focusing instead on matching student populations found in longitudinal surveys^{13,14}, California community colleges¹⁵, or a sample drawn from IPEDS.¹⁶ One key methodological feature missing is linear regression; most of the research reviewed used logistic regression on whether an individual student graduated instead of predicting the institution's rate. The present project seeks to address those gaps in community college research.

2.2 *Measuring Success*

As an institution of higher education, graduation rates are the standard measure of success and productivity of a community college. Community colleges have the lowest graduation rates of all institutions - the National Center for Education Statistics reports

⁹ Thomas Bailey, Juan Carlos Calcagno, Davis Jenkins, Gregory Kienzl, and Timothy Leinbach, "Community College Student Success: What Institutional Characteristics Make a Difference?," *Community College Research Center*, October 2005, <http://files.eric.ed.gov/fulltext/ED489096.pdf>.

¹⁰ Hongwei Yu, Dale Campbell, and Pilar Mendoza, "The Relationship between the Employment of Part-Time Faculty and Student Degree and/or Certificate Completion in Two-Year Community Colleges," *Community College Journal of Research and Practice* 39, no. 11 (2015).

¹¹ Saman Yaghmaee, "Predicting Completion Rate with Institutional Characteristics and Practices at Public Community Colleges in California," (doctoral thesis, San Diego State University, 2013), https://sdsu-dspace.calstate.edu/bitstream/handle/10211.3/119081/Yaghmaee_sdsu_0220D_10243.pdf.

¹² Marissa Vasquez Urias and J. Luke Wood, "Black Male Graduation Rates in Community Colleges: Do Institutional Characteristics Make a Difference," *Community College Journal of Research and Practice* 38, no. 12 (2014).

¹³ Bailey et al., "Community College Student Success".

¹⁴ Yu, Campbell, and Mendoza, "Employment of Part-time Faculty".

¹⁵ Yaghmaee, "Predicting Completion Rate".

¹⁶ Urias and Wood, "Black Male Graduation Rates".

29.1% graduating in three years or less with an associate's degree¹⁷ compared to 59.4% for bachelor's degrees in six years.¹⁸ The federal government reports graduation rates at 150% of time to degree (i.e., three years for a two year degree), and only for first-time students enrolled full-time. Some practitioners and researchers have argued against this as a metric, because most community college students attend part time (62% of students in American Association of Community Colleges member colleges¹⁹), meaning the majority of students are not captured in the cohort.

However, graduation rates are useful for an analysis of college success for a number of reasons. First, as a result of the 1990 Student Right to Know Act, each institution receiving federal financial aid is required to post its 150% time to degree graduation rate prominently on its website.²⁰ Through this requirement, students themselves are judging the value of an institution based on this number. Second, an analysis by the federal Department of Education, to whom all colleges must report this data annually, found that increasing the time range to 200% of degree time (or four years for an associate's degree) did not significantly increase graduation rates, leaving 150% as an acceptable benchmark.²¹ Lastly, a number of community college systems with

¹⁷ National Center for Education Statistics, "Digest of Education Statistics Table 326.20: Graduation Rate from the First Institution Attended Within 150 Percent Of Normal Time For First-Time, Full-Time Degree/Certificate-Seeking Students at 2-Year Postsecondary Institutions, by Race/Ethnicity, Sex, and Control of Institution: Selected Cohort Entry Years, 2000 through 2012," *US Department of Education*, October 2016, https://nces.ed.gov/programs/digest/d16/tables/dt16_326.20.asp.

¹⁸ National Center for Education Statistics, "Digest of Education Statistics Table 326.10: Graduation Rate From First Institution Attended For First-Time, Full-Time Bachelor's Degree- Seeking Students at 4-Year Postsecondary Institutions, by Race/Ethnicity, Time to Completion, Sex, Control Of Institution, and Acceptance Rate: Selected Cohort Entry Years, 1996 through 2009," *US Department of Education*, October 2016, https://nces.ed.gov/programs/digest/d16/tables/dt16_326.10.asp.

¹⁹ "Our Fact Sheet", *American Association of Community Colleges*.

²⁰ National Center for Education Statistics, "Tracking Students to 200 Percent of Normal Time: Effect on Institutional Graduation Rates," *US Department of Education*, December 2010, <https://nces.ed.gov/pubs2011/2011221.pdf>, 1.

²¹ *Ibid.*

performance funding allocating state dollars to institutions based on a formula incorporate on-time or 150% time graduation rates as a metric to determine funding (e.g., Kansas and Missouri).²²

2.3 Nontraditional Students

Nontraditional student as a concept is both vague and widely used in the research literature. A meta-analysis of 45 definitions of “nontraditional” in student mental health research revealed 13 categories of definitions, including age, commuter status, gap between ending high school and college, and ethnicity.²³ The latest data available from the National Center for Education Statistics suggests that the number of students with one or more “nontraditional” characteristics including dependents, time off between high school and college, or possessing a GED instead of a diploma has remained steady between 70% and 75% over the last twenty years.²⁴ Using the age cut-off as 25 and over for nontraditional (common in the literature²⁵), that group has grown by over 2 million students since 2000.²⁶ This is especially germane in the community college, where the average student age is 28.²⁷ By either metric, the number of nontraditional students is

²² “Performance Based Funding for Higher Education,” *National Conference of State Legislatures*, last updated July 31, 2015, <http://www.ncsl.org/research/education/performance-funding.aspx>.

²³ Ethel Chung, Deborah Turnbull, and Anna Chur-Hansen, “Who Are ‘Non-Traditional’ Students? A Systematic Review of Published Definitions in Research on Mental Health of Tertiary Students,” *Educational Research and Reviews* 9, no. 23 (2014).

²⁴ “Demographic and Enrollment Characteristics of Nontraditional Undergraduates: 2011-12,” *US Department of Education*, September 2015, <https://nces.ed.gov/pubs2015/2015025.pdf>.

²⁵ Brian P. Tilley, “What Makes a Student Non-Traditional? A Comparison of Students Over and Under Age 25 in Online, Accelerated Psychology Courses,” *Psychology Learning and Teaching* 13, no. 2 (2014).

²⁶ National Center for Education Statistics, “Digest of Education Statistics Table 303.40: Total Fall Enrollment in Degree-granting Postsecondary Institutions, by Attendance Status, Sex, and Age: Selected Years, 1970 through 2026,” *US Department of Education*, April 2017, https://nces.ed.gov/programs/digest/d16/tables/dt16_303.40.asp.

²⁷ “Our Fact Sheet,” *American Association of Community Colleges*.

large and the success of this body, however narrowly or broadly defined, drives the success of all students in a much larger sense than might be expected.

Nontraditional students, whether by age, presence of children, full-time job, or other metric, face more obstacles to completing a postsecondary degree than a traditional student. Theories abound on the source of motivation to re-enter school. Multiple studies named career goals and the rigor of an education as reasons^{28,29}; other studies suggest nontraditional students are more intrinsically motivated to prove themselves and learn new things.³⁰ The difference in study results examining the motivation to go back to school, and the very real likelihood there is no one overwhelming answer, creates uncertainty in the potential effect of their presence on graduation rates.

Factors likely to influence persistence to graduation are also diverse in the research literature. Studies have found GPA and confidence in graduating³¹, schedule flexibility³², and family support³³ to be important in nontraditional student success. These findings represent a mixture of personal characteristics (feeling supported, feeling confidence) and institutional factors (grades earned, flexibility of course-taking options)

²⁸ Tricia van Rhijn, Donna S. Lero, and Taniesha Burke, "Why Go Back to School? Investigating the Motivations of Student Parents to Pursue Post-Secondary Education," *New Horizons in Adult Education & Human Resource Development* 28, no. 2 (2016).

²⁹ Jeffrey Stevens, "Perceptions, Attitudes, & Preferences of Adult Learners in Higher Education: A National Survey," *Journal of Learning in Higher Education* 10, no. 2 (2014).

³⁰ Shani Shillingford and Nancy Jo Karlin, "The Role of Intrinsic Motivation in the Academic Pursuits of Nontraditional Students," *New Horizons in Adult Education & Human Resource Development* 25, no. 3 (2013).

³¹ Gail Markle, "Factors Influencing Persistence among Nontraditional University Students," *Adult Education Quarterly* 65, no. 3 (2015).

³² Carrie Ann Prendergast, "Nontraditional Online Student Perceptions of Student Success Conditions," (doctoral thesis, Pepperdine University, 2014), <https://search.proquest.com/openview/7b5f04805713f91fec43747065a87eb2/1?pq-origsite=gscholar&cbl=18750&diss=y>.

³³ Ramon B. Goings, "(Re)defining the Narrative: High-Achieving Nontraditional Black Male Undergraduates at a Historically Black College and University," *Adult Education Quarterly* 66, no. 3 (2016).

affecting the student's graduation. Research disagrees on the effect of financial aid on outcomes; Seftor and Turner found that Pell grants had a sizeable effect on enrollment decisions for older students³⁴, but Chen and Hossler found that financial aid availability influences the dropout decision but does not encourage on-time degree completion.³⁵

The two common themes across research on nontraditional students are dearth of research and conflict of research. Another noticeable deficit was the lack of quantitative rigor and size of population across the studies outside of Stevens.³⁶ Many utilized very small qualitative surveys or interviews to draw their conclusions. In contrast, the present research will use a national quantitative dataset. It is beyond the scope of this paper to suggest causal mechanisms for why a nontraditional student population may influence an institution's graduation rate, but establishing the correlation will provide a basis for further research on this population, its needs in order to be successful, and strategies and supports that can help this and other populations.

3. Data and Methods

3.1 Source

This analysis uses a federal dataset collected and presented by the US Department of Education for all variables. The College Scorecard dataset covers all undergraduate degree-granting institutions, but some data points are only available for institutions offering Title IV federal aid. The following analyses were conducted using the most recent data, uploaded in September of 2017, and covering the 2015-2016 academic year.

³⁴ Neil S. Seftor and Sarah E. Turner, "Back to School: Federal Student Aid Policy and Adult College Enrollment," *The Journal of Human Resources* 37, no. 2 (2002).

³⁵ Jin Chen and Don Hossler, "The Effects of Financial Aid on College Success of Two-Year Beginning Nontraditional Students," *Research in Higher Education* 58, no. 1 (2017).

³⁶ Jeffrey Stevens, "Perceptions, Attitudes, & Preferences".

Community colleges, the unit of analysis, were selected for inclusion into the dataset based on awarding predominantly associate's degrees (instead of highest degree, which would exclude colleges in those states who are authorized to offer applied bachelor's degrees) and the institution being under public control, excluding for-profit schools which are likely to have a different set of influential factors. These filters produced a dataset with 761 records, which was further narrowed to 649 in the regression with the greatest number of variables after removing institutions with null values in one or more variables. Descriptive statistics for the colleges included in the final analysis follow in Table 1.

Table 1: Descriptive Statistics of Included Community Colleges

	Graduation Rate	Independent Students	Undergraduates	Full-Time Faculty	White Students	Part-Time Students
Maximum	79.43%	85.92%	59,193	100%	95.86%	87.42%
Minimum	4.26%	6.69%	81	9.65%	0%	.22%
Median	21.92%	42.63%	3,859	38.82%	58.75%	51.48%
Mean	23%	42.5%	5,981	50.78%	54.29%	49.28%
Standard Deviation	10.45%	11.79%	6,575	29.39%	25.36%	16.8%

3.2 Variables

Each college had one dependent variable (150% graduation rate) and five independent variables (% of independent students, number of undergraduates, % full-time faculty, % white students, and % part-time students) that are currently theorized to impact an institution's graduation rate. Each variable is defined by the US Department of

Education in its annual collection instructions to colleges. The dependent variable, 150% graduation time, is the percent of first-time, full-time students who graduate with an associate's degree in 3 years or less (150% of normal time for a 2-year degree).

The percent of independent students is the inverse of the College Scorecard-provided share of dependent students, which is students classified as dependent on their parents for financial aid purposes. This is used as a proxy for nontraditional in the regressions for a number of reasons. Primarily, it is a composite capturing many of the factors researchers consider nontraditional – students are classified as independent for financial aid purposes if they are 24 or older, married, on active duty or a veteran, a parent supporting their children, an orphan or ward of the state, an emancipated minor, or a homeless minor. It is also a standardized, readily available measure for nontraditional, allowing for comparisons across thousands of institutions. Lastly, dependency status has been used in other studies as a stand-in for nontraditional.³⁷

The other variables serve as control independent variables, representing other institutional characteristics known to impact graduation rates. Number of undergraduates is a count of certificate or degree-seeking students on each campus. Percent of faculty that is full-time only refers to hours and not tenure status. Percent of students who identify as white is noted to have changed meaning over time but currently means white, non-Hispanic. Like number of undergraduates, percent of students attending part-time also only counts certificate or degree-seeking undergraduate students.

³⁷ Cody Davidson and Kristin B. Wilson, ““Warming up” in the Developmental Sequence? Upward Transfer Conditional on Dependency Status,” *Kentucky Journal of Higher Education Policy and Practice* 3, no. 2 (2015).

3.3 Methods

The results were produced using ordinary least squares regression via the `lm()` function in R, the open source statistical software package. A series of regressions examined the effect of percentage of independent students on a college's graduation rate, with subsequent regressions controlling for institutional demographic variables. Two final regressions incorporate the interaction between part-time students and independent students.

4. Results

The relationship between graduation rates and percentage of independent students is captured in Figure 1 below. The scatterplot with regression line fitted is an illustration not only of the negative relationship between the variables, but the general clustering of institutions around the 50% independent student and 20% graduation space. This clustering around the mean on both variables may partially explain the lack of dramatic decline in graduation rate when moving from low percentages of independent students to high percentages of independent students.

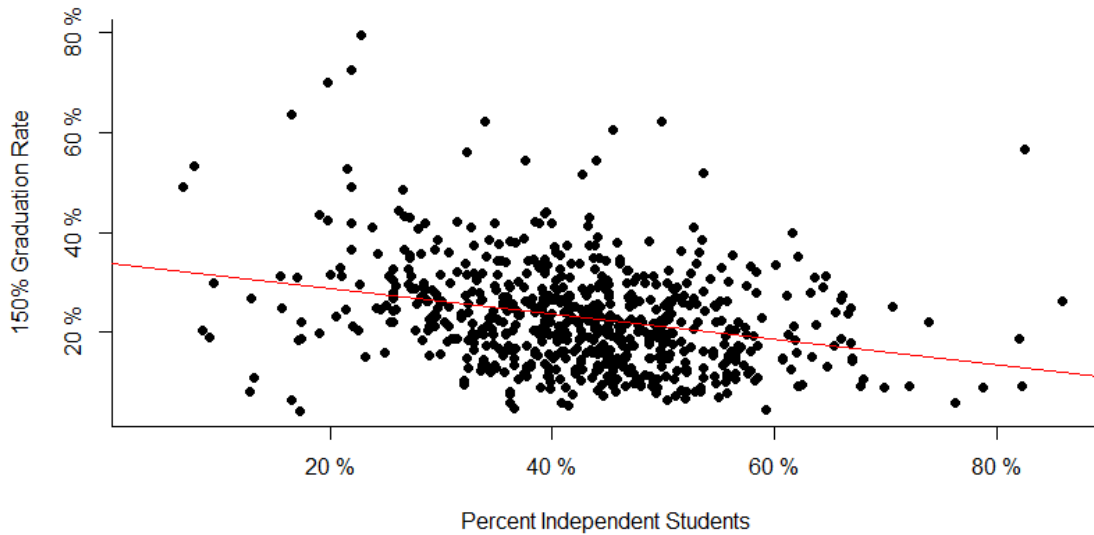


Figure 1. Relationship between Independent Student Percentage and Graduation Rate

A series of OLS regressions further explored the relationship between these two variables when mediated by other institutional characteristics noted in the literature as impactful. In addition, the interactive effect of independent students and part-time status was included in an effort to separate a potential trait of independent students which may contribute to any effect their presence has on graduation rates. The results follow in Table 2.

Table 2 demonstrates that the percent of independent students has a clear negative effect across all five models. This implies that an institution's graduation rate is higher with fewer independent students or lower with more independent students. The p-value on percent of students that are independent was exceedingly low in all five models (below .000), implying that the coefficients have a small probability of being due to chance. The difference made by the presence of independent students is statistically significant.

Table 2: The Effect of Independent Students on a Community College's Graduation Rate

	A	B	C	D	E
Constant	.337 (.015)	.305 (.02)	.360 (.021)	.445 (.034)	.469 (.031)
% of students that are independent	-.252*** (.033)	-.242*** (.033)	-.125*** (.036)	-.352*** (.08)	-.339*** (.08)
Number of undergraduates	-	-0.00** (.000)	-0.00 (.000)	-0.00 (.000)	-
% of faculty that is full-time	-	.020 (.013)	-.004 (.013)	-.004 (.013)	-
% of students that are white	-	.055*** (.016)	.04* (.016)	.041** (.016)	-
% of students that are part-time	-	-	-.189*** (.029)	-.392*** (.070)	-.416*** (.068)
% independent X % students part-time	-	-	-	.505** (.159)	.505** (.159)
<i>n</i>	656	651	650	649	654
R ²	.081	.133	.187	.2	.19
Adjusted R ²	.08	.128	.180	.19	.18

Note: Standard errors reported in parentheses. Significance indicated by * (.05), ** (.01), and *** (.001 and lower).

4.1 Multiple Regressions

In Model A, a public community college with 100% independent students would see a 25.2% decrease in its graduation rate, from a baseline of 33.7% to 8.5%. In Model B, the incorporation of other variables reduces the impact somewhat, but a 100% independent student body would decrease graduation rates by 24.2%, holding the other variables constant. The addition of percentage of students attending part-time in Model C halves the effect of independent students on the graduation rate; the percentage of part-time students has a large negative effect on graduation rates, more sizeable than any other coefficient.

4.2 Interactive Effect Regressions

Model D incorporates an interactive effect, which accounts for the effect one independent variable has on another independent variable's impact on the dependent variable. The interaction of percent of independent students and the percent of students that attend college part-time acknowledges that 71% of part-time students are financially independent.³⁸ This relationship makes it likely that different values of one or the other will affect how much the other one affects the graduation rate. Figure 2 below provides a visual overview of Model E, the relationship between the two without the other independent variables.

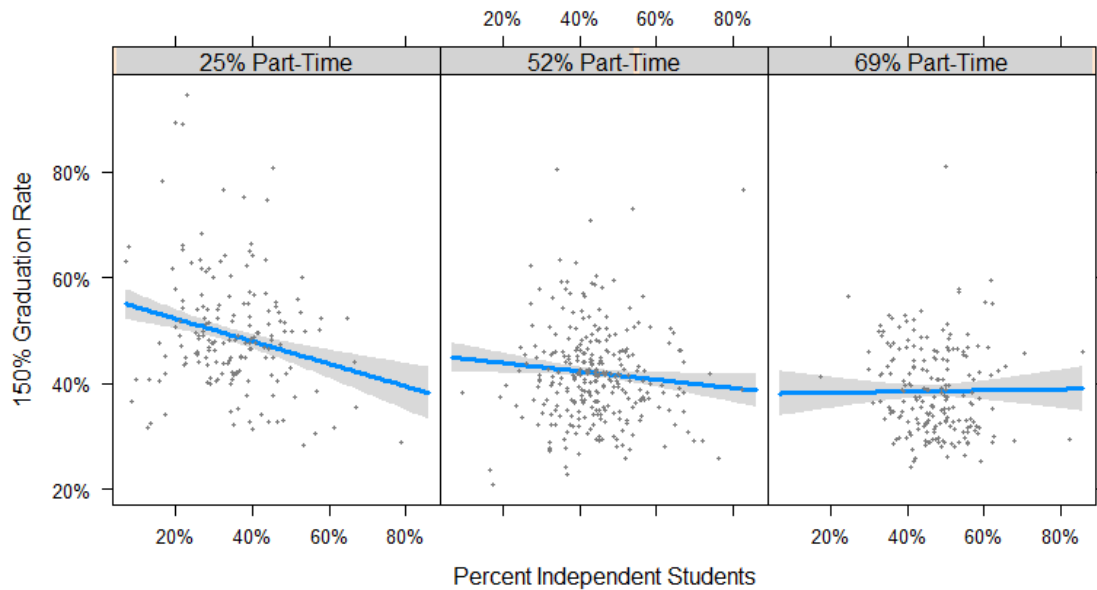


Figure 2: Interactive Effect of Independent Students and Part-Time Students

³⁸ Marcella Bombardieri, "Hidden in Plain Sight: Understanding Part-Time College Students in America," *Center for American Progress*, last modified Sep 6, 2017, <https://www.americanprogress.org/issues/education-postsecondary/reports/2017/09/06/438341/hidden-plain-sight/>.

The three charts in Figure 2 show the relationship between percent of independent students and graduation rate for three different values of part-time students. The blue lines are the regression equations, the grey area around the lines represents the confidence interval, and the dots represent individual institutions. The cut-offs for the different values of part-time students were chosen by R's visreg package, which defaults to 10%, 50%, and 90% deciles to display.

On the left, institutions with only a quarter of their students attending part-time show a much steeper negative relationship between independent students and graduation rate. The relationship is still present, but less impactful for institutions with about half of their students attending part-time. The relationship is non-existent for institutions with almost 70% of their students attending part-time.

Across the three charts, the institutions appear to cluster tighter around lower graduation rates as the percentage of part-time students increases. This supports previous research which has found part-time status leads to lower graduation rates.³⁹ The visualization shows that an increase in an institution's part-time students weakens and potentially eliminates the effect of a large independent student population.

4.3 Cross-Model Results

Another finding of note is the examination of the effect of full-time faculty on the institution's graduation rate. Between Models B and C, which differ by one variable (part-time students), the effect of an increase in full-time faculty goes from positive to

³⁹ Christian Tizon, "Signature Report 12 Completing College: A National View of Student Attainment Rates – Fall 2010 Cohort," *National Student Clearinghouse Research Center*, last modified Dec 4, 2016, <https://nscresearchcenter.org/signaturereport12/>.

negative. In neither model is the variable significant. This is an interesting result in light of the research literature's disagreement on whether having more full-time faculty impacts graduation rates. With this dataset the effect, if any, is small, unreliable, and insignificant.

Similarly, the impact of the size of an institution (measured in number of undergraduates) moved from significant to insignificant between Model B and C. Studies covered in the literature review disagreed on which institution size was associated with higher graduation rates. These regressions give larger institutions a negative effect on graduation, but so slight as to be immaterial.

Overall, the models evince low R^2 and adjusted R^2 . The variables examined in the present study do not explain more than 20% of the variation in the graduation rate. Model D, the regression with the most variables, only explains 12% more than Model A, which had only one independent variable. Model E removes size of institution, faculty employment status, and race/ethnicity of students and retains almost as much explanatory power as Model D, which included all independent variables and the interactive effect.

Independent student percentage and part-time student percentage are both influential and as the interactive effect shows, interrelated in their effect on graduation rates. The low explanatory power of the models hints at a much broader set of variables impacting graduation rates, which should drive future research agendas. There may be no one variable responsible for a large share of variation between institutions or there may be a handful responsible for a large share, as these two are in the present models.

5. Conclusion

This paper's goal was to investigate the relationship between a public community college's percentage of student body that is nontraditional, operationalized as students filing independent on the FAFSA form, and an institution's 150% time graduation rate. This analysis resulted in two main findings: the presence of nontraditional students has a negative impact on an institution's graduation rate, and the percentage of part-time students has a strong moderating influence on the impact of nontraditional students. The negative pressure of nontraditional students was statistically significant at the lowest level of p-value, which suggests a true relationship not due to random chance in this dataset and/or year.

5.1 Limitations of the Research

The primary limit of this inquiry is the definition of nontraditional student. As discussed in the literature review, there has been much debate over the characteristics that should be, or are, included in definitions of nontraditional student. By using independent status on the FAFSA as a proxy, a grouping of characteristics which students may possess any number of, it invites the possibility that one or more of those underlying attributes is truly driving the impact of nontraditional/independent student presence on graduation rates. The above regressions are a starting point for further exploration of the individual traits that alone or in concert may influence graduation rates.

A second limitation is the inclusion of only public community colleges with data reported to the federal government. These limits significantly shrank the dataset pool, from 1,579 two-year institutions and branch campuses to the 654 campuses that were public community colleges awarding primarily two-year degrees and had data available for each independent variable and graduation rate. Further improvements to the dataset as

time passes are likely the best hope for removing this limitation; additional analyses could also focus separately on private and for-profit institutions, which have student bodies that differ from public community colleges but serve significant nontraditional populations.

5.2 Future Avenues for Research

Community colleges, and the nontraditional students they serve, are overdue for serious scholarly inquiry. These institutions serve millions of students each year, many of them low-income and students of color, yet have lacked serious popular or academic attention until the past decade. Student success in the workplace or in transferring to baccalaureate institutions is crucial in these colleges and must continue to be the focus of quantitative and qualitative research studies.

The chief avenue for future research suggested by this study is a deeper dive into the separate and intersecting identities in “nontraditional” – age, parental or marital status, veteran status, emancipation status, or other characteristics may drive success or the lack thereof and underlie the clear impact demonstrated in the present study. Other traits associated with nontraditional students, such as part-time attendance, should also be evaluated. Assessing the weight of these characteristics will involve constructing a richer dataset at the institutional level, likely with the assistance of national bodies who have policy influence and a history of convening practitioners and policymakers around data collection and analysis.

Once the research community has a clearer understanding of which facets of nontraditional status impact graduation, if there are clear and generalizable answers, the

research must be directed at why those variables impact graduation. Colleges cannot begin to address the most troublesome hurdles unless they know what those hurdles are and why they present such challenges to completion. For example, low-income students may complete at lower rates – is it because poverty prevents them from buying books, or having stable transportation, or requires quitting school to increase working hours, or something else? The why is just as vital to the solution as the what.

5.3 Policy Implications

Finding new keys to increasing graduation rates is critically important to driving national, state, and local education and economic goals. Increasing the percent of the population with degrees, particularly among the low-income and people of color, has been a policy goal at multiple levels of government for decades. The recent trend towards pushing more students into STEM fields is also a policy goal to be achieved at the community college level considering how many of the targeted demographics begin their education at the two-year level.

Focus on nontraditional student populations is important now but will grow in urgency as populations decline in the northeast and Midwest United States and colleges must turn to nontraditional students to retain enrollments. Additionally, state allocations to community colleges are increasingly driven by formulas that take into account the number and types of degrees produced when allocating funds. Finding a way to serve nontraditional students will be crucial to the two-year sector as they serve greater numbers of these students with larger amounts of funding riding on their success.

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7. Curriculum Vita

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